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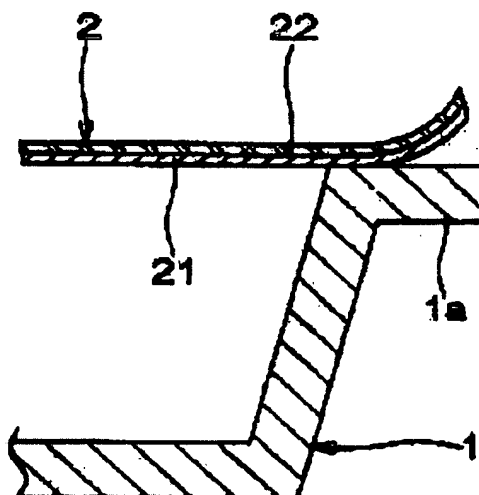
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## (54) RESIN COMPOSITION AND VESSEL THEREFROM

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a new resin compsn. capable of forming a vessel itself and a lid having both good thermal bonding and easy peeling properties without requiring a thermal bonding layer, and a vessel therefrom.

**SOLUTION:** This resin compsn. contains a rubber modified styrene resin which is a styrene resin in which a rubber-like polymer is dispersed so as to be an occlusion type dispersed particle, and also contains a copolymer of an unsaturated carboxylic acid, its ester or vinyl acetate, and ethylene (a), a propylene resin (b), and a copolymer of an unsaturated carboxylic acid, its ester or vinyl acetate, and ethylene (c) in the wt. ratio of (a)/(b)/(c)=10/87/3-50/30/20. This vessel is a combination of a vessel itself 1 obt'd. by molding the resin compsn. or the propylene resin and a lid 2 whose thermal bonding surface to the vessel itself 1 is formed from the propylene resin or the resin compsn.



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**CLAIMS**

[Claim(s)]

[Claim 1] (a) While having the particulate material configuration of the single occlusion mold which the rubber-like polymer which connotes the single continuous phase which consists of styrene resin into the continuous phase which consists of styrene resin distributed The rubber conversion styrene resin which the copolymer of the at least one sort and ethylene which were chosen from the group which consists of unsaturated carboxylic acid, unsaturated-carboxylic acid ester, and vinyl acetate contained, (b) Propylene system resin and (c) The copolymer of the at least one sort and ethylene which were chosen from the group which consists of unsaturated carboxylic acid, unsaturated-carboxylic acid ester, and vinyl acetate, The resin constituent characterized by containing by the weight ratio at a rate of (a)/(b)/(c) = 10/87/3-50/30/20.

[Claim 2] The container characterized by having the body of a container which fabricated the resin constituent according to claim 1, and was acquired, and the lid of the shape of a film in which the heat adhesion side over the body of a container concerned was formed by propylene system resin.

[Claim 3] The container characterized by having the body of a container which fabricated propylene system resin and was acquired, and the lid of the shape of a film in which the heat adhesion side over the body of a container concerned was formed with the resin constituent according to claim 1.

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## DETAILED DESCRIPTION

## [Detailed Description of the Invention]

[0001] [Field of the Invention] Especially this invention relates to the new resin constituent excellent also in the easy PUH nature after heat adhesion, and the container which used it. For example, is used suitable for a package of food, such as tofu and fermented soybeans, while it is excellent in the heat adhesion (heat sealing) nature to propylene system resin.

[0002] [Description of the Prior Art] In case of the use of the container, such as a supermarket After holding with water the tofu carried into the predetermined daily dose for one dish etc. in the body of a container which can hold the whole. Although the so-called package of the body of a container which carried out heat adhesion and closed the film used as a lid to opening of the body of a container concerned was common, in order to raise productivity recently, after being filled up with soybean milk before sealing etc. in the body of a container, the package of the filling type made to seal within the body of a container concerned is spreading.

[0003] In the package of an end type, the clearance between the body of a container and a container was closed up, and then the lid was taken out. If the lid of the container, such as a kitchen knife, is put in and closed to a lid, heat adhesion of the lid was firmly carried out on the body of a container from a viewpoint which prevents the leakage of water etc. However, in the package of a filling type, when the lid of a container was put in and closed to the lid etc. the above, the break entered even to the inner side, the side of the lid was not out and there was a problem that appearance was not good.

[0004] Then, in order to solve this, the use of the container which has the so-called easy PUH nature which enabled it to tear off comparatively simply the lid which carried out heat adhesion from the body of a container, without using cutters, such as a kitchen knife, is spreading. As a container which has this easy PUH nature (Example 1) (a) The body of a container formed by resin, such as a propylene system resin and a styrene resin, as shown in (a), (b) What combined the lid of the shape of a film which carried out the heat adhesion of the layer (heat glue line) g1 of the resin which carried out the heat adhesion properly over the above-mentioned resin and the so-called easy PUH nature which can be torn off comparatively easily after heat adhesion is common to the heat adhesion side over the body of a container concerned.

[0005] In the mechanism of adhesion of the lid 82 in the above-mentioned container 80, the heat glue line g1 is so that it may be on the heat adhesion side of the lid 82, which is in the interface of heat adhesion with the body of a container, as that it may be on a film (a) heat-resistant resin, which is on the heat adhesion side of the body of a container, without adhesion with the body of a container by which heat adhesion was carried out, and the heat glue line g1 was carried out from the lid 82 so that it might be on the adhesive failure by which heat glue line g1 the very thing is destroyed while a layer, and a film (a) in addition, in order to reinforce the heat-resistant resin 82 concerned, it is a surface layer by which a laminate is carried out and which was formed from polyethylene terephthalate resin (PET), nylon, etc., while it prints the name of contents, explanation, etc. on the front face of the base material layer 821

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material as the original fabric sheet is used, the edge material which comes out so much cannot be reused, and the demand of streamlining of saving resources and cost cannot be accepted.

[0014] Moreover, although the motion which repeats the body of a container after use for the purpose of streamlining of saving resources and cost is preparing, therefore desirably for every class of resin in the case of for example, resin dust is called for, since it is impossible for every layer, the body of a container of the two-layer structure which carried out the heat adhesion of the heat glue line as mentioned above also has the problem that recycle is not easy, in the present condition.

[0015] Although the main purpose of this invention does not need the heat glue line which produces various problems as mentioned above, it is to offer the new resin constituent which can form the body of a container which combines a good heat adhesive property and easy PUH nature, and a lid. Moreover, other purposes of this invention have a body of a container, and a lid in offering the new container which combines a good heat adhesive property and easy PUH nature by using this resin constituent.

[0016] [Means for Solving the Problem] In order to solve the above-mentioned technical problem, they examined many things so that articles may set the object of heat adhesion as the most common propylene system resin as a raw material of the base material layer of a lid, or the body of a container, may be obtained in a proper way the propylene system resin, such as a heat adhesive property and easy PUH nature, and may first find out the resin which have the reinforcement which can moreover fully be used also as a base material layer of the body of a container, or a lid, with stability, etc.

[0017] Consequently, (a) While having the particulate material configuration of the single occlusion (occlusion, endocytosis) mold which the rubber-like polymer which connects the single continuous phase which consists of styrene resin into the continuous phase which consists of styrene resin distributed. The rubber conversion styrene resin which the copolymer of the at least one sort and ethylene which were chosen from the group which consists of unsaturated carboxylic acid, unsaturated carboxylic acid ester, and vinyl acetate contained. (b) The styrene resin in the rubber conversion styrene resin of (a) which does not have compatibility fundamentally, and the propylene system resin of (b) including propylene system resin Components other than the styrene resin in (a). The resin constituent distributed in heterogeneity according to an operation with the characteristic particulate material configuration of (a) found out combining a moderate heat adhesive property and easy PUH nature.

[0018] Namely, this resin constituent is obtained (which are the object of heat adhesion / the propylene system resin and affiliated). Although it has a very high heat adhesive property, to the propylene system resin of (b) which does not almost have easy PUH nature by dissolving in homogeneity the styrene resin in the rubber conversion styrene resin of (a) which does not have a heat adhesive property, being equivalent to what gave easy PUH nature, and adjusting the certain rate of both components B becomes what combine a heat adhesive property moderate as mentioned above and easy PUH nature.

[0019] When articles inquire further, however, only of two components of the above (a) and (b) it is the temperature requirement which the temperature requirement where heat adhesion is usually performed, i.e., resin, base, and dose heat produces YAGI, is continued throughout the about 100-230-degree C temperature requirement. It was stabilized and heat adhesion could not be performed, but since the heat adhesive property in a less than 180-degree C low-temperature region did not have especially enough heat adhesion temperature, it became clear that required seal reinforcement was not obtained.

[0020] Then, the result of the above-mentioned resin constituent of having inquired further in order to improve the heat adhesive property in a low-temperature region and to raise the stability of the heat adhesion according a large temperature requirement especially, (a) which has both compatibility and heat adhesion, further for two components of the above (a) and (b) unsaturated carboxylic acid, it came to complete (the copolymer of the at least one sort and ethylene which were chosen from the group which consists of unsaturated carboxylic acid ester and vinyl acetate) a member and this invention for what is necessary being the specified quantity

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where printing nature is not enough, when a sign 828 is usually formed by the resin of a pressure system etc. in these drawings.

[0026] the above — the substitution of container contents according (in which membrane and) to the vibration at the time of transportation etc. — or since a sign 828 etc. is not produced, the seal reinforcement after heat adhesion with the body of a container and a lid 82 is set to about 0.4 to 1.5 kg / about 15mm. In order to adjust seal reinforcement to this range, adjusting the presentation of the resin which forms the heat glue line g1, or adjusting the thickness of the heat glue line g1 is performed.

[0027] It is suitably chosen according to the class of contents, the configuration of a container, etc. of which substitution a mechanism is adopted. However, the field by which heat adhesion was carried out in the adhesive failure of an, or intermediate peeling of the PUH range 91a whose heat glue line g1 is heat joining of the body of a container at the time of substitution of a lid 82, the field which remained in the lid 82 side, without carrying out heat adhesion of the container carrier sealant fracture. And the fractured area may remain in the condition of having overflew flange 91a inside the body of a container, having hung down, or having stopped in two sides of the body of a container, without fracturing it finally.

[0028] For this reason, conventionally, intermediate peeling of 90 in which the above course do not remain is adopted suitably. However, intermediate peeling had the problem that it was difficult to maintain the minimum range of the seal reinforcement mentioned above, in order that seal reinforcement might tend to have changed a lot in response to the effect of the setup at the time of heat adhesion (heat adhesion temperature, time amount, etc.), the environmental temperature at the time of an activity, adhesion of contents, etc.

[0029] While not being a lid 82 side and forming the heat glue line g1 in the body of a container there as indicated by the 2nd case of — of sight from the 14th line of the patent No. 5740074 official report etc., the container which adopted intermediate peeling of the streamlining so which can substitute seal reinforcement etc. rather than intermediate peeling as a mechanism of adhesion was proposed (refer to document 2).

[0030] In addition, since there is a possibility that the heat glue line g1 may be too fractured in this container by the field of flange 91a by which heat adhesion was carried out in the lid 82 side, and the field which remained in the body of a container at the time of substitution of a lid 82, and a course may arise like invention given in the above-mentioned patent official report, although not illustrated to flange 91a, establishing the structure (forming hole etc.) for fracturing the heat glue line g1 finally at the time of substitution of a lid 82 is performed to it.

[0031] [Problem(s) to be Solved by the Invention] The heat glue line was required, when the number of layers as the seal and the whole increased, in order to establish the structure for fracturing a heat glue line finally as mentioned above, the body of a container and the structure of the metal mold for the shaping became complicated, and seal each of conventional containers had produced problems, such as a fall of productivity, and a cost rise.

[0032] Moreover, the container with many (as mentioned above) number of layers also had the problem that it could not fully respond to the demand of streamlining of saving resources and cost in recent years. That is, relating again the edge material out of which it comes so much at the time of the shaping that it should correspond to the demand of streamlining of recent years, saving resources, and cost through the edge material of the sheet which remains in the perimeter of the body of the container fabricated while the body of a container generally fabricated the plastic original fabric sheet in the configuration of the body of a container by the vacuum forming, extrusion forming, etc. using container is removed and it is manufactured as a new material of an original fabric sheet is considered.

[0033] However, although edge material is reusable as a new material of an original fabric sheet since the laminating of the heat glue line is carried out to a lid side the said flange 8 (a) — (a), and the body of a container serves as the monolayer structure where the original fabric sheet was also formed by single resin when monolayer structure is sufficient when forming a heat glue line in the body side of a container the flange 8. Since the thing of the laminate structure which carried out the laminating of the layer and heat glue line of the resin used as a base

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and just to make it certain.

[0034] That is, the resin constituent of this invention is characterized by containing the rubber conversion styrene resin of the above (a) the propylene system resin of (b), and the copolymer of (a) by the weight ratio at a rate of (a)/(b)/(c) = 10/70/5-50/50/50. Moreover, the body of a container which the container of this invention fabricated the above-mentioned resin constituent and was required. The body of a container which was equipped with the lid of the shape of a film in which the heat adhesion side over the body of a container concerned was formed by propylene system resin, or fabricated propylene system resin curvilinearly and was sealed. The heat adhesion side over the body of a container concerned is characterized by having the lid of the shape of a film formed with the above-mentioned resin constituent.

[0035] [Embodiment of the Invention] Below, this invention is explained. The resin constituent of this invention is (a) as mentioned above first. While having the particulate material configuration of the single occlusion mold which the rubber-like polymer which connects the single continuous phase which consists of styrene resin into the continuous phase which consists of styrene resin distributed. The rubber conversion styrene resin which the copolymer of the at least one sort and ethylene which were chosen from the group which consists of unsaturated carboxylic acid, unsaturated carboxylic acid ester, and vinyl acetate contained. (b) Propylene system resin and (c) The copolymer of the at least one sort and ethylene which were chosen from the group which consists of unsaturated carboxylic acid, unsaturated carboxylic acid ester, and vinyl acetate. It contains by the weight ratio at a rate of (a)/(b)/(c) = 10/70/5-50/50/50.

[0036] Among these, as styrene resin contained in the rubber conversion styrene resin of (a), the copolymer of styrene, styrene, and other vinyl monomers etc. can be used. (the copolymer of styrene) As other vinyl monomers in which styrene and copolymerization are possible, acrylonitrile, a methacrylonitrile, an acrylate, a methacrylate, a methyl methacrylate, a methyl methacrylate, etc. are raised, for example. These styrene resin is used independently, respectively, and also it can also use two or more sorts together.

[0037] Moreover, if the effectiveness of raising the reinforcement of a resin constituent etc. is taken into consideration as a rubber-like polymer distributed in the styrene resin, especially styrene system resin will be desirable and polybutadiene, a styrene-butadiene copolymer, an ethylene-propylene-butadiene ternary copolymer etc. can be raised as this styrene system resin. Moreover, each various polybutadiene of even low cis- polybutadiene (polybutadiene) with the content of cis- association high as polybutadiene / high / cis- with the low content of cis- association is useful among the above.

[0038] These rubber is also used independently, respectively, one also two or more sorts can also be used together. The above-mentioned rubber-like polymer is distributed so that it may have the particulate material configuration of a single occlusion mold in the continuous phase which consists of styrene resin. The particulate material configuration of a single occlusion mold points out that in which the particle of the rubber-like polymer of a large number distributed in the continuous phase of styrene resin has the so-called core shell structure which connected the single continuous phase which becomes the interior of the particle which makes the rubber-like polymer concerned outer shell respectively from styrene resin.

[0039] The so-called core shell structure which connected the granule shell of much styrene resin inside the particle which makes an outer shell the rubber-like polymer concerned which the particle of the rubber-like polymer distributed in the continuous phase of styrene resin shows the single occlusion type of particulate material configuration in much usual rubber destruction styrene resin differ clearly. The rubber conversion styrene resin which has the above-mentioned particulate material configuration of a single occlusion mold has the advantage that appearance, such as gloss, improves, compared with what has same structure.

[0040] Under assistance of the block copolymer (styrene-butadiene block copolymer etc.) for the styrene for example, whose styrene content is about 18-60%, and rubber, the rubber destruction styrene resin which has the particulate material configuration of a single occlusion mold derives out the polymerization of the styrene and is manufactured. As for the distributed particle size (mean particle diameter) in the inside of the continuous phase of the styrene resin

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of the particle of the rubber-like polymer in the particulate material configuration of a single container mold is in the range of about 0.1-0.5 micrometers.

[0032] There is a possibility that the reinforcement of a resin constituent may fail, under the range of the above (a) the distributed particle size of the particle of a rubber-like polymer. Moreover, conversely, when distributed particle size exceeds the above-mentioned range, in order for the homogeneity of rubber denaturation styrene resin to fail, there is a possibility that the reinforcement of a resin constituent may fail too, and also there is a possibility that appearance, such as gloss, may get worse. In addition, as for separately the distributed particle size of the particle of a rubber-like polymer, it is desirable that within the limits of the above is also about 0.1-0.5 micrometers.

[0033] The particulate material configuration and distributed particle size of a particle of this rubber-like polymer are measured as follows, and are observed. That is, the ultrathin section of rubber denaturation styrene resin is produced using ultramicrotome and, after being immersed in an osmium tetroxide solution for about one day and drying it, while taking the transmission electron microscope photograph and shooting the particulate material configuration of the particle of the rubber-like polymer in a photograph, the distributed particle size of the above-mentioned rubber-like polymer is measured.

[0034] As a copolymer of the at least one sort and ethylene which were chosen from the group which consists of the unsaturated carboxylic acid, unsaturated-carboxylic acid ester, and vinyl acetate which are made to contain in the above-mentioned rubber denaturation styrene resin, on ethylene-acrylic acid copolymer, an ethylene-methacrylic acid copolymer, an ethylene-methyl methacrylate copolymer, an ethylene-ethyl methacrylate copolymer, an ethylene-vinyl methacrylate copolymer, an ethylene-vinyl acetate copolymer, etc. are related, for example. These copolymers are also used independently, respectively, and also two or more sorts can also be used together.

[0035] As for this copolymer, it is desirable to make it contain in the range of 0.1 - 10 weight section extent to the rubber denaturation styrene resin 100 weight section. There is a possibility that the reinforcement of a resin constituent may fail, under the range of the above (a) the content of a copolymer. Moreover, when the content of a copolymer exceeds the above-mentioned range conversely, there is a possibility that the thermal resistance of a resin constituent may fail.

[0036] In addition, as for the content of a copolymer, it is desirable that especially within the limits of the above is also 1 - 5 weight section extent to the rubber denaturation styrene resin 100 weight section. As the above-mentioned rubber denaturation styrene resin of (a), various kinds of resin indicated by JP.8-181600.A, for example, is related. Since the trade name SJS200 light DJ series by Sumitomo Chemical Co., Ltd. is related and has numbers DJS000 and DJS000 etc. are excellent in aspect also especially especially in (a) as the example although not limited to this for example, it is used suitably.

[0037] As propylene system resin of the above (b), random or a block copolymer of ethene, a propylene, and ethylene of a propylene etc. can be used. [homopolymer] These propylene system resin is also used independently, respectively, and also two or more sorts can also be used together. In addition, the homopolymer of a propylene, i.e., polypropylene, — or, although each thing which has various stereoregularity is usable as a propylene part in the block copolymer of a propylene and ethylene. Since the rubber denaturation styrene resin of (a) itself is excellent in compatibility with propylene system resin as mentioned above in this invention, And used that copolymer with propylene resin with low compatibility with usual propylene system resin should be secured. It is not necessary to use the special polypropylene which has expensive special and syndiotactic structure. The usual general-purpose polypropylene which mainly has isotactic structure and atactic structure (both are rare cases) also has a good compatibility component, of course) can be used.

[0038] As the copolymer of the above (a) was especially mentioned above, heat adhesion temperature improves the heat adhesive property of a resin constituent in a less than 180-degree C low-temperature region. [are a component for raising the stability of heat adhesion, and same with having established in the rubber conversion styrene resin of (a)] Each copolymer of

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In the range of extent which does not affect the property of the manufactured resin constituent.

[0040] Moreover, although the resin constituent of this invention is fundamentally used by unfusing, it may be made to fuse if needed. What is necessary is just to make it fuse to coincide with the case of extrusion molding of the original fabric sheet which uses a fusing agent usual to making resin film, for example, because the origin of the body of a container is carried out. Below, the container of this invention is explained. As an example of the container of this invention, as shown for example in FIG. 1, a unit containing the body 1 of a container of the container structure formed by single resin and the film-like lid 2 is related.

[0041] And it sets to this invention and to (1) while forming with the resin constituent of this invention which mentioned the body 1 of a container above among the above. The base material layer S1 which serves as a heat adhesion side over the body 1 of a container among side 2 is formed by propylene system resin, or it is (2) conversely. While forming the body 1 of a container by propylene system resin A moderate heat adhesive property and easy PIRU nature are given between the body 1 of a container, and a lid 2 by forming the base material layer S1 which serves as a heat adhesion side over the body 1 of a container among side 2 with the resin constituent of this invention.

[0042] Among the above, the body 1 of a container is plate-like [which carried out extrusion molding of the resin constituent or propylene system resin of this invention and formed it], and removes the edge material of the sheet which remains in the perimeter of the fabricated body of a container, and is manufactured with laminating the original fabric sheet of nonwoven structure in the configuration of the body of a container by the vacuum forming, pressure forming, etc. as usual. Moreover, a lid 2 carries out the laminating of the surface layer S2 shown in drawing if needed to the base material layer S1 of the shape of a film which carried out extrusion molding of propylene system resin or the resin constituent of this invention, and formed it like the base material, and is manufactured.

[0043] In order to reinforce the base material layer S1, the laminating of it is carried out, and a surface layer S2 is formed from polyethylene terephthalate resin (PET), nylon, etc. as usual while it prints the name of trademark, registration, etc. as stated previously. As for printing, it is desirable to form in the field of the side by which a laminating is carried out to the base material layer S1 of a surface layer S2. The laminating of the surface layer S2 concerned can be carried out in the phase of the extrusion after the time of extrusion molding of the base material layer S1, or shaping.

[0044] In addition, it is desirable to form the base material layer S1 of a lid 2 by propylene system resin with more high transparency while the resin constituent of this invention forms the body 1 of a container with the resin constituent of this invention to make a lid 2 into transparency by the reasons of the design etc., the particulate material configuration mentioned above therefore in order (being translucent) to be, to carry out and to present the shape of clarity. However, when transparency may be adopted when there is no need that a lid 2 is transparent.

[0045] The container equipped with the above-mentioned body 1 of a container and an above-mentioned lid 2 is applicable to a package of various forms, such as tubs, etc. for the conventional thing. For example, after being filled up with various food before edibility etc. in the body 1 of a container, usual heat adhesion equipment is used for fusing in which is heat joining of the body 1 of a container concerned, in the package of tubs of the filling tubs type mentioned above, it is the conditions of the usual heat adhesion, and it should just carry out heat adhesion of the lid 2.

[0046] Since the body 1 of a container and the base material layer S1 used as the heat adhesion side of a lid 2 are formed containing the resin constituent and propylene system resin of this invention as mentioned above, respectively, although the container of this invention does not have a heat plus film, it becomes what contains a moderate heat adhesive property and easy PIRU nature. Moreover, since the body 1 of a container is formed in nonwoven structure only with the resin constituent or propylene system resin of this invention in the case of the example of drawing, it becomes recyclable (after reuse of edge material, or use). However, the laminating of other films may be carried out to the body 1 of a container if needed.

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the at least one sort and ethylene which were chosen from the group which consists of unsaturated carboxylic acid, unsaturated-carboxylic acid ester, and vinyl acetate is usable.

[0047] That is, an ethylene-acrylic acid copolymer, an ethylene-methacrylic acid copolymer, an ethylene-methyl methacrylate copolymer, an ethylene-ethyl methacrylate copolymer, an ethylene-vinyl methacrylate copolymer, an ethylene-vinyl acetate copolymer, etc. can be used independently, respectively, and also two or more sorts can also be used together among these.

[0048] As a suitable copolymer of (a) for this invention, an ethylene-vinylacetate copolymer (EVA) is related among the above. In this EVA, although the content ratio of a vinyl acetate component is closely involved in the heat adhesive property in low temperature and limitation is not carried out to this, that when content ratio of vinyl acetate is about 5 - 25 % of the weight is raised as suitable EVA for this invention.

[0049] It is described above in this invention, it is necessary to make it contain by the weight ratio at a rate of 50/50 (a) = 10/90 (b) = 50/50 (c), as the rubber denaturation styrene resin of (a), the propylene system resin of (b), and the copolymer of (c) were mentioned above. That is, the field of a sheet and the continuous line surrounding it is equivalent to the range of the content ratio of three components of (a) - (c) in the resin constituent of this invention among the triangular Figs. shown in FIG. 1.

[0050] When there is less rubber denaturation styrene resin of (a) than the above-mentioned range, or when there is much propylene system resin of (b) while the seal reinforcement in a propylene 150 degree C or more becomes (especially heat adhesion temperature) high too much and easy PIRU nature fail, when especially a resin constituent is used for the body of a container, the reinforcement of the body of a container concerned fails, and the vessel will become weak and the great stability of the body of a container will fail.

[0051] Moreover, the temperature requirement (180-220 degree C) where heat adhesion mentioned above is usually satisfactorily performed when there is more rubber conversion styrene resin of (a) than the above-mentioned range, or when there is little propylene system resin of (b) — while the whole region is covered mostly and seal reinforcement runs short, thermal and thermal resistance of a container will fail, and brittleness will become high. Moreover, when there is less copolymer of (c) than the above-mentioned range, especially heat adhesion temperature becomes inadequate (the effectiveness) by having made the copolymer concerned contain of improving the heat adhesive property in a less than 180-degree C low-temperature region), and the seal reinforcement in this low-temperature region runs short.

[0052] Moreover, when the resin constituent conversely applied especially when there is more copolymer of (c) than the above-mentioned range is used for the body of a container, the reinforcement of the body of a container concerned fails, and the vessel will become weak and the great stability of the body of a container will fail. In addition, when the balance of each property mentioned above especially the seal reinforcement in a low-temperature region, and the easy PIRU nature in a propylene etc. is taken into consideration, as for content (rate a/b/c) of the three above-mentioned component, it is desirable that especially within the limits of the above is also about 15/85/5-30/70/30, and it is still more desirable that it is about 15/85/5-20/80/20.

[0053] Moreover, in using this resin constituent for the body of a container especially reinforcement, nerve, etc. of the body of a container which were further mentioned above in addition to balance with the easy PIRU nature in the above-mentioned seal reinforcement in a low-temperature region and an above-mentioned propylene are taken into consideration. As for especially content (rate a/b/c) of three components, it is desirable that within the limits of the above is also about 15/85/5-30/70/30, and it is still more desirable that it is about 15/85/5-20/80/20.

[0054] In the resin constituent of this invention, additives, such as a lubricant agent, a coloring agent, a flame retardant, lubricant (various kinds, such as a hydrocarbon system, a fatty-acid system, a fatty-acid amide system, an ester system, and an alcohol system, metal soap, silicon oil, low molecular weight polyethylene, etc.), dispersant in liquid paraffin, a polyethylene glycol, polybutene, etc., a dispersant, and a thermal stabilizer, may be added. These additives are added

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[0055] Although essentially the seal reinforcement of a lid 2 in the container of this invention is not limited, it is the range of practical heat adhesion temperature. As mentioned above in order to combine a moderate heat adhesive property and easy PIRU nature. For example, it is desirable that they are about 0.4 to 1.5 kgf / about 15mm in a 170-220-degree C heat adhesion temperature requirement. It is still more desirable that they are about 0.4 to 1.5 kgf / about 15mm in a 180-220-degree C heat adhesion temperature requirement larger than it, and it is desirable that they are about 0.4 to 1.5 kgf / about 15mm in a 190-220 above-mentioned degree C heat adhesion temperature requirement much more.

[0056] In addition, the configuration of this invention is not limited to the thing of an example mentioned above. For example, the application of the resin constituent of this invention is not limited to a container, but the application to various fields is possible for it using a heat adhesive property with propylene system resin, and easy PIRU nature. Moreover, when using it for a container, the combination of the reinforcement of the body 1 of a container or a lid 2, laminating, and resin etc. is not limited to the thing of the example of drawing, but a proper design change is possible for it in accordance with the application of a container etc.

[0057] In addition, various modification can be performed in the range which does not change the summary of this invention.

[0058] [Example] This invention is explained based on an example and the example of a comparison below.

The container was obtained combining the body of a container and lid which were manufactured by the example 1 following.

Configuration of the body of a container: The resin 10 weight section of following A1 as rubber denaturation styrene resin of the above (a). The resin 75 weight section of following B1 as propylene system resin of (b). After carrying out the dryblend of the coloring agent (the trade name YPPO1575 by Sumitomo Color CO., LTD.) of the 1.5 weight section to the resin 10 weight section of the following C 1 as a copolymer of (c), and a total of 100 weight section of these resin. The heater of a monophase extruding press machine is supplied, it fused and mixture was made to knead within a diameter φ100mm screw cylinder.

[0059] A1: Rubber denaturation styrene resin which the ethylene-acrylic acid copolymer contained while the particle of a styrene-butadiene block copolymer was distributed in the continuous phase which consists of polystyrene so that it might have the particulate material configuration of a single container mold like the above-mentioned trade name SJS200 light DJ 0000 by Sumitomo Chemical Co., Ltd.]

B1: Ethylene-propylene block copolymer [trade name EG-77]

C1: Ethylene-vinylacetate copolymer [the Japan Polychem trade name LV 540]

From the T die which attached the above-mentioned melting and a leading object at the tip of a screw cylinder next, extrusion molding was carried out to the shape of a sheet into a diameter φ, and the thickness of 0.5mm and the original fabric sheet of not fusing [with a 100kg / 900 weight per ton] were manufactured.

[0060] And the single-angled vacuum forming machine was used, the vacuum forming of this original fabric sheet was carried out under 700 degree C and the conditions for [heating time] 20 seconds 1500 degree C and the bottom on [stoving temperature] [dressing laying temperature], it has the shape of a rectangle whose inside distance of opening of a container is 115mm by 115mm, and the depth manufactured the body of a container of a square shape whose width of face of 115mm and a flange is 10mm.

Manufacture of a lid: The laminated film used as a lid which forms a base material layer with a thickness of 40 micrometers, and has the two-layer structure of the base material layer and a surface layer concerned by carrying out a laminating to one side of a PET film with a thickness [as a surface layer] of 12 micrometers continuously was manufactured carrying out extrusion molding of the resin of the above B1 as propylene system resin to the shape of a film.

[0061] The container was obtained combining the same lid as having manufactured the body of a container like the example 1, and having manufactured it in the example 1 aspect having considered as the value which shows the amount (weight section) of said resin used of A1-01 as

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three sorts of resin of (a) - (c) which forms examples 2-7, the example 1 of a comparison, and the body of 8 containers in the following tables 1 and 2.

[0067] While using only two sorts, the resin of A1 as rubber denaturation styrene resin of (a), and the resin of B1 as propylene system resin of (b), as resin which forms the example 8 of a comparison - the body of 8 containers, without using the resin of (a) The container was obtained combining the same lid as having manufactured the body of a container like the example 1, and having manufactured it in the example 1 except having considered as the value which shows the amount of two sorts of these resin used (weight content) in the following tables 3 and 4.

[0068] Heat adhesion of the original fabric sheet in front of a vacuum forming obtained in heat adhesive property test above-mentioned each example and the example of a comparison and the laminated film used as a lid was carried out using heat adhesion equipment at the heat adhesion temperature (heating temperature) shown in the following tables 1-4 under heat adhesion pressure (set point) 1.0 kg/cm<sup>2</sup> and the condition for [heat adhesion time amount] 0.5 seconds.

[0069] And after carrying out and cutting down the above-mentioned heat adhesion object in width of base of 18mm and the length of 38mm, 180 degrees was torn off and the seal reinforcement (top / 16mm) in 18mm width of base at the time was measured. A result is shown in Tables 3-5 and drawings 3, and 4. Moreover, it plotted on the triangular Fig. of drawings 2 which mentioned above the presentation of the body of a container in each example and the example of a comparison. In addition, in these drawings, the example was written as "ex." and the example of a comparison was written as "an."

(Table 1)

	A1	B1	C1	D1	E1	F1	G1	H1	I1	J1	K1	L1	M1	N1	O1	P1	Q1	R1	S1	T1	U1	V1	W1	X1	Y1	Z1
Weight content (%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

(Table 2)

	A1	B1	C1	D1	E1	F1	G1	H1	I1	J1	K1	L1	M1	N1	O1	P1	Q1	R1	S1	T1	U1	V1	W1	X1	Y1	Z1
Weight content (%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

(Table 3)

	A1	B1	C1	D1	E1	F1	G1	H1	I1	J1	K1	L1	M1	N1	O1	P1	Q1	R1	S1	T1	U1	V1	W1	X1	Y1	Z1
Weight content (%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

(Table 3)

	A1	B1	C1	D1	E1	F1	G1	H1	I1	J1	K1	L1	M1	N1	O1	P1	Q1	R1	S1	T1	U1	V1	W1	X1	Y1	Z1
Weight content (%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

[0080] It became clear from the result of the above-mentioned table and drawing that the container of each example all became what combines sufficient seal reinforcement and easy POFU nature in the range of larger heat adhesion temperature compared with the thing of each example of a comparison.

While using said resin of B1 which is propylene system resin as a raw material of the body of example 8 container, the container was obtained like the example 1 in said example 1 as a raw material of a base material layer among the laminated films used as a lid except having used the same resin constituent as having formed the body of a container.

[0084] And when the heat adhesive property was evaluated like the above about the original fabric sheet before carrying out the vacuum forming of the body of a container, and the laminated film used as a lid, the almost same measurement result as an example 1 was obtained.

[0085] (Effect of the invention) As mentioned above, as explained in full detail in spite of not needing the heat glue line which produces various problems according to this invention, the characteristic operation effectiveness which combines a good heat adhesive property and easy POFU nature and which can form the body of a container and lid of a container that a new resin constituent can be offered is done so. Moreover, according to this invention, a heat glue line is omitted by using this resin constituent, and the body of a container becomes possible (also offering the new container with which the body of a container and a lid combine a good heat adhesive property and easy POFU nature), considering as the monolayer structure in which the recycle after reuse of edge material or use is possible.

(Translation done.)

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

**[Drawing 1]** It is the outline sectional view showing an example of lamination of the body of a container which constitutes the container of this invention, and a lid.

**[Drawing 2]** It is the triangular Fig. in the resin constituent of this invention showing the range of a content rate of the resin of three components.

**[Drawing 3]** It is the graph which shows the relation of the heat adhesion temperature and seal reinforcement in the example of this invention, and the example of a comparison.

**[Drawing 4]** It is the graph which shows the relation of the heat adhesion temperature and seal reinforcement in the example of a comparison of this invention.

**[Drawing 5]** This drawing (a) - (c) is the outline sectional view showing an example of lamination of the body of a container which constitutes the conventional container, and a lid, respectively.

**[Drawing 6]** It is the outline sectional view showing other examples of lamination of the body of a container which constitutes the conventional container, and a lid.

**[Description of Notations]**

1 Body of Container

2 Lid

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[Translation done.]

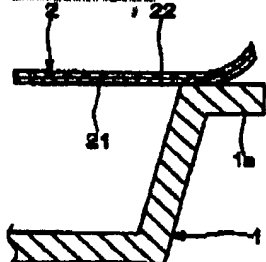
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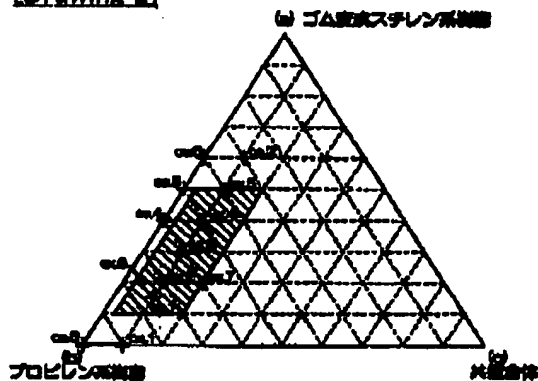
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## DRAWINGS

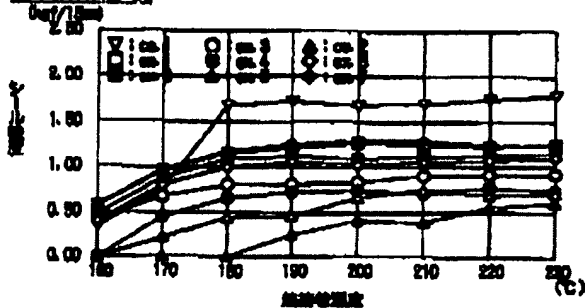
[Drawing 1]



[Drawing 2]

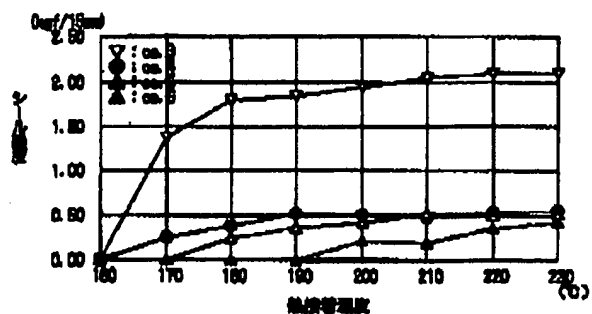


[Drawing 3]

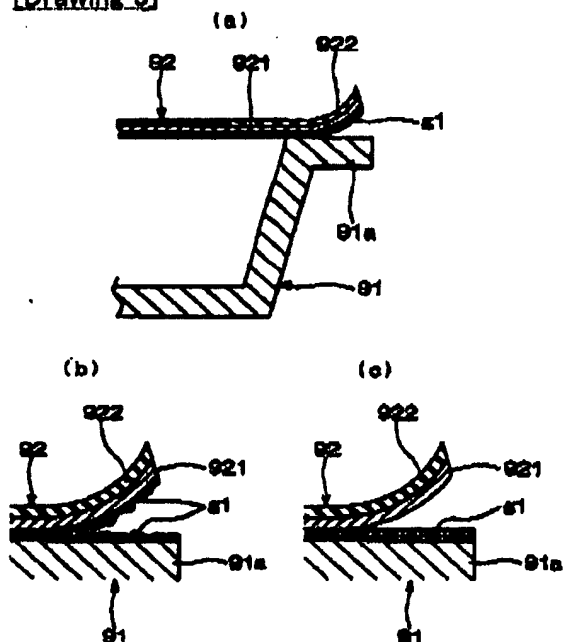


[Drawing 4]

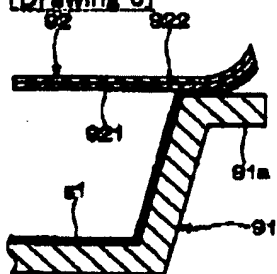




[Drawing 5]



[Drawing 6]



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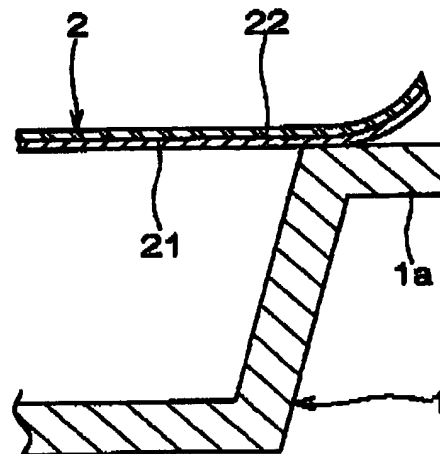
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(54) 【発明の名称】 樹脂組成物とそれを用いた容器

(57) 【要約】

【課題】 熱接着層を必要とせずに、しかも良好な熱接着性とイージーピール性を兼ね備えた容器本体や蓋体などを形成できる新規な樹脂組成物と、それを用いた容器とを提供する。

【解決手段】 樹脂組成物は、(a) スチレン系樹脂中に、ゴム状重合体が単一オクルージョン型の分散粒子形状となるように分散され、かつ不飽和カルボン酸、そのエステルまたは酢酸ビニルと、エチレンとの共重合体が含有されたゴム変成スチレン系樹脂、(b) プロピレン系樹脂、および(c) 不飽和カルボン酸、そのエステルまたは酢酸ビニルと、エチレンとの共重合体、を重量比で (a)/(b)/(c)=10/87/3~50/30/20の割合で含有する。容器は、上記樹脂組成物、またはプロピレン系樹脂を成形して得られた容器本体1と、当該容器本体1に対する熱接着面がプロピレン系樹脂、または上記樹脂組成物で形成された蓋体2とを組み合わせた。



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## 【特許請求の範囲】

【請求項 1】(a) スチレン系樹脂からなる連続相中に、スチレン系樹脂からなる単一の連続相を内包するゴム状重合体が分散した、単一オクルージョン型の分散粒子形状を有するとともに、不飽和カルボン酸、不飽和カルボン酸エステルおよび酢酸ビニルからなる群より選ばれた少なくとも 1 種とエチレンとの共重合体が含有されたゴム変成スチレン系樹脂と、

(b) プロピレン系樹脂と、

(c) 不飽和カルボン酸、不飽和カルボン酸エステルおよび酢酸ビニルからなる群より選ばれた少なくとも 1 種とエチレンとの共重合体と、を重量比で (a)/(b)/(c) = 10/87/3 ~ 50/30/20 の割合で含有することを特徴とする樹脂組成物。

【請求項 2】請求項 1 記載の樹脂組成物を成形して得られた容器本体と、当該容器本体に対する熱接着面がプロピレン系樹脂にて形成されたフィルム状の蓋体とを備えることを特徴とする容器。

【請求項 3】プロピレン系樹脂を成形して得られた容器本体と、当該容器本体に対する熱接着面が、請求項 1 記載の樹脂組成物にて形成されたフィルム状の蓋体とを備えることを特徴とする容器。

## 【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、とくにプロピレン系樹脂に対する熱接着（ヒートシール）性にすぐれるとともに、熱接着後のイージーピール性にもすぐれた新規な樹脂組成物と、それを用いた、たとえば豆腐や納豆などの食品の包装に好適に使用される容器とに関するものである。

【0002】

【従来の技術】従来、豆腐をスーパーマーケットなどの店頭で販売する際には、1丁分などの所定の分量に切り分けた豆腐を、その全体を収容しうる容器本体内に水とともに収容したのち、当該容器本体の開口に蓋体となるフィルムを熱接着して閉じる、いわゆる切り豆腐式の包装が一般的であったが近時、生産性を高めるために、凝固する前の豆乳などを容器本体内に充てんした後、当該容器本体内で凝固させる充てん豆腐式の包装が広がりつつある。

【0003】切り豆腐式の包装の場合は、豆腐と容器との隙間を狙って、蓋体に包丁などの刃物の先端を入れて切り開けば豆腐を取り出すことができるため、蓋体は、水の漏れを確実に防止する観点から、容器本体に強固に熱接着されていた。しかし充てん豆腐式の包装の場合は、上記と同様に蓋体に刃物の先端を入れて切り開くと中の豆腐まで切れ目が入ってしまい、豆腐の切りくずが出て見た目がよくないという問題があった。

【0004】そこでこれを解決するために、熱接着した蓋体を、包丁などの刃物を使わずに、容器本体から比較

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的簡単に引き剥がすことができるようにした、いわゆるイージーピール性を有する容器の利用が広がりつつある。かかるイージーピール性を有する容器としては、たとえば図 5 (a) ~ (c) に示すように、プロピレン系、スチレン系などの樹脂にて形成された容器本体 91 と、当該容器本体 91 に対する熱接着面に、上記樹脂に対する熱接着性と、熱接着後、比較的簡単に引き剥がすことのできる、いわゆるイージーピール性とを兼ね備えた樹脂の層（熱接着層）g1 を積層したフィルム状の蓋体 92 とを組み合わせたものが一般的である。

【0005】上記容器における蓋体 92 の剥離のメカニズムには、

① 図 (a) にみるように熱接着層 g1 が、容器本体 91 との熱接着の界面で剥離する界面剥離、

② 図 (b) にみるように、熱接着層 g1 自体が層内で破壊される凝集破壊、および

③ 図 (c) にみるように熱接着層 g1 が、熱接着された容器本体 91 と剥離せずに、当該容器本体 91 側に残って、もともと積層されていた蓋体 92 の基材層 921 との間で剥離する層間剥離、

がある。なおこれらの図において符号 922 は、通常、プロピレン系の樹脂などで形成されるために印刷性が十分でない基材層 921 の表面に、内容物の名称や説明などの印刷をするとともに、当該基材層 921 を補強するために積層される、ポリエチレンテレフタレート樹脂（PET）やナイロンなどで形成された表面層である。

【0006】上記いずれのメカニズムにおいても、輸送時の振動などによる容器内容物の飛び出しや、あるいは液漏れなどを生じないために、容器本体 91 と蓋体 92 との熱接着後のシール強度は、およそ 0.4 ~ 1.5 kgf/15 mm 程度に設定される。シール強度をこの範囲に調整するには、たとえば熱接着層 g1 を形成する樹脂の組成を調整したり、あるいは熱接着層 g1 の厚みを調整したりすることが行われる。

【0007】どの剥離のメカニズムを採用するかは、内容物の種類、容器の形状などに応じて適宜、選択される。しかし②の凝集破壊や③の層間剥離では、蓋体 92 の剥離時に、熱接着層 g1 が、容器本体 91 の熱接着部であるフランジ 91a に熱接着された領域と、容器中央部の、熱接着されずに蓋体 92 側に残った領域とに破断され、しかもそれがきれいに破断されずに、破断された切れ端が、フランジ 91a から容器本体 91 の内側にはみ出したり垂れ下がったり、あるいは容器本体 91 の 2 辺間に跨ったりした状態で残る場合がある。

【0008】このため従来は、上記のような切れ端が残らない①の界面剥離が好適に採用される。しかし界面剥離は、熱接着時の設定条件（熱接着温度や時間など）、作業時の環境温度、内容物の付着などの影響を受けて、シール強度が大きく変化しやすいために、前述したシール強度の好適範囲を維持するのが難しいという問題があ

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った。

【0008】そこで、たとえば特許第2740014号公報の第3欄第8行～第14行などに記載されているように、蓋体92側でなく容器本体91側に熱接着層81を設けるとともに、剥離のメカニズムとして、界面剥離よりもシール強度などを安定させることができる、前記④の層間剥離を採用した容器が提案された〔図6参照〕。

【0010】なおかかる容器においては、やはり蓋体92の剥離時に、熱接着層81が、蓋体92側に熱接着されたフランジ91aの領域と、容器本体91側に残った領域とに破断されて切れ端が生じるおそれがあるので、上記特許公報に記載の発明のように、フランジ91aに、図示していないが蓋体92の剥離時に熱接着層81をきれいに破断するための構造(打ち抜き穴など)を設けることが行われている。

【0011】

【発明が解決しようとする課題】前記従来の容器はいずれも熱接着層が必要で、その分、全体としての層数が多くなる上、前記のように熱接着層をきれいに破断するための構造を設けるために容器本体と、その成形のための金型の構造が複雑になるなどして、生産性の低下、コストアップ等の問題を生じていた。

【0012】また、上記のように層数の多い容器は、近年の、省資源とゴミの減量化の要求に十分に対応できないという問題もあった。すなわち容器のうち容器本体は一般に、平板状の原反シートを真空成形、圧空成形などによって容器本体の形状に成形するとともに、成形された容器本体の周囲に残るシートの端材を除去して製造されるが、近年、省資源とゴミの減量化の要求に対応すべく、かかる成形時に多量に出る端材を、再び原反シートの原料として再利用することが検討されている。

【0013】しかし、前記図5(a)～(c)のように熱接着層が蓋体側に積層され、容器本体は単層構造でよい場合には、その原反シートも単一の樹脂で形成された単層構造となるため、端材を原反シートの原料として再利用できるが、図8のように容器本体側に熱接着層を形成する場合は、その原反シートとして、基材となる樹脂の層と、熱接着層とを積層した積層構造のものが使用されるために、多量に出る端材を再利用することができず、省資源とゴミの減量化の要求に応じることができないのである。

【0014】また、やはり省資源とゴミの減量化を目的として、使用後の容器本体をリサイクルする動きが盛んになりつつあり、そのために、たとえば樹脂ゴミの場合は樹脂の種類ごとに分別することが求められるが、上記のように熱接着層を積層した2層構造の容器本体は層ごとに分離できないために、現状ではリサイクルが容易でないという問題もある。

【0015】本発明の主たる目的は、上記のように種々

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の問題を生じる熱接着層を必要としないにも拘わらず、良好な熱接着性とイージーピール性とを兼ね備えた容器本体や蓋体を形成しうる、新規な樹脂組成物を提供することにある。また本発明の他の目的は、かかる樹脂組成物を用いることによって、容器本体と蓋体とが良好な熱接着性とイージーピール性とを兼ね備えた、新規な容器を提供することにある。

【0016】

【課題を解決するための手段】上記課題を解決するために、発明者らはまず熱接着の対象を、蓋体の基材層と容器本体の原料として最も一般的なプロピレン系樹脂に設定して、かかるプロピレン系樹脂に対する熱接着性、イージーピール性などの特性にすぐれ、しかも容器本体や蓋体の基材層としても十分に使用できる強度や形態安定性などを有する樹脂を見出すべく、種々検討した。

【0017】その結果、(a) スチレン系樹脂からなる連続相中に、スチレン系樹脂からなる単一の連続相を内包するゴム状重合体が分散した、単一オクルージョン(occlusion、内包)型の分散粒子形状を有するとともに、不飽和カルボン酸、不飽和カルボン酸エステルおよび酢酸ビニルからなる群より選ばれた少なくとも1種とエチレンとの共重合体が含有されたゴム変成スチレン系樹脂と、(b) プロピレン系樹脂と、を含み、基本的には相溶性を有しない(a)のゴム変成スチレン系樹脂中のスチレン系樹脂と(b)のプロピレン系樹脂とを、(a)中のスチレン系樹脂以外の成分と、(a)の特有の分散粒子形状との作用によって均一に相溶させた樹脂組成物が、適度な熱接着性とイージーピール性とを兼ね備えたものであることを見出した。

【0018】すなわちかかる樹脂組成物は、熱接着の対象であるプロピレン系樹脂と同系で、きわめて高い熱接着性を有するものの、それゆえにイージーピール性が殆どない(b)のプロピレン系樹脂に、熱接着性を有しない、(a)のゴム変成スチレン系樹脂中のスチレン系樹脂を均一に相溶させて、イージーピール性を付与したものに相当し、両成分の含有割合を調整することによって、上記のように適度な熱接着性とイージーピール性とを兼ね備えたものとなるのである。

【0019】ところが、発明者らがさらに検討を行ったところ、上記(a)(b)の2成分だけでは、熱接着が通常行われる温度範囲、すなわち樹脂が熔融し、かつヤケを生じない温度範囲である、およそ180～230℃の温度範囲の全域に亘って安定して熱接着を行えず、とくに熱接着温度が180℃未満の低温域での熱接着性が十分でないために、必要なシール強度が得られないことが判明した。

【0020】そこで、上記樹脂組成物のとくに低温域での熱接着性を向上して、広い温度範囲に亘る熱接着の安定性を高めるべくさらに検討を行った結果、上記(a)(b)の2成分にさらに、両成分と相溶性を有する、(c) 不飽

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和カルボン酸、不飽和カルボン酸エステルおよび酢酸ビニルからなる群より選ばれた少なくとも1種とエチレンとの共重合体を所定量、含有させればよいことを見出し、本発明を完成するに至った。

【0021】すなわち本発明の樹脂組成物は、上記(a)のゴム変性スチレン系樹脂と、(b)のプロピレン系樹脂と、(c)の共重合体とを重量比で(a)/(b)/(c)=10/87/3~50/30/20の割合で含有することを特徴とするものである。また、本発明の容器は、上記の樹脂組成物を成形して得られた容器本体と、当該容器本体に対する熱接着面がプロピレン系樹脂にて形成されたフィルム状の蓋体とを備えるか、または逆に、プロピレン系樹脂を成形して得られた容器本体と、当該容器本体に対する熱接着面が、上記の樹脂組成物にて形成されたフィルム状の蓋体とを備えることを特徴とするものである。

【0022】

【発明の実施の形態】以下に、本発明を説明する。まず本発明の樹脂組成物は、前記のように、(a) スチレン系樹脂からなる連続相中に、スチレン系樹脂からなる単一の連続相を内包するゴム状重合体が分散した、単一オクルージョン型の分散粒子形状を有するとともに、不飽和カルボン酸、不飽和カルボン酸エステルおよび酢酸ビニルからなる群より選ばれた少なくとも1種とエチレンとの共重合体が含有されたゴム変性スチレン系樹脂と、(b) プロピレン系樹脂と、(c) 不飽和カルボン酸、不飽和カルボン酸エステルおよび酢酸ビニルからなる群より選ばれた少なくとも1種とエチレンとの共重合体と、を重量比で(a)/(b)/(c)=10/87/3~50/30/20の割合で含有するものである。

【0023】このうち(a)のゴム変性スチレン系樹脂に含まれるスチレン系樹脂としては、スチレンの単独重合体の他、スチレンと、他のビニルモノマーとの共重合体なども使用できる。スチレンと共重合可能な他のビニルモノマーとしては、たとえばアクリロニトリル、メタクリロニトリル、アクリル酸、メタクリル酸、アクリル酸メチル、メタクリル酸メチルなどがあげられる。これらのスチレン系樹脂はそれぞれ単独で使用される他、2種以上を併用することもできる。

【0024】また、かかるスチレン系樹脂中に分散されるゴム状重合体としては、樹脂組成物の強度を向上させる効果などを考慮すると、とくにジエン系ゴムが好ましく、かかるジエン系ゴムとしてはたとえばポリブタジエン、スチレン-ブタジエン共重合体、エチレン-プロピレン-非共役ジエン三元共重合体などがあげられる。また、上記のうちポリブタジエンとしては、シス結合の含有率が高いハイシスポリブタジエンから、シス結合の含有率が低いローシスポリブタジエンまでの種々のポリブタジエンが、いずれも使用可能である。

【0025】これらのゴムもそれぞれ単独で使用される

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他、2種以上を併用することもできる。上記ゴム状重合体は、スチレン系樹脂からなる連続相中に、単一オクルージョン型の分散粒子形状を有するように分散される。単一オクルージョン型の分散粒子形状とは、スチレン系樹脂の連続相中に分散された多数のゴム状重合体の粒子がそれぞれ、当該ゴム状重合体を外殻とする粒子内部に、スチレン系樹脂からなる単一の連続相を内包した、いわゆるコアシェル構造を有するものを指す。

【0026】かかる単一オクルージョン型の分散粒子形状は、通常の多くのゴム変性スチレン系樹脂において、スチレン系樹脂の連続相中に分散されたゴム状重合体の粒子が示す、当該ゴム状重合体を外殻とする粒子内部に、多数のスチレン系樹脂の小粒子を内包したいわゆるサラミ構造とは明らかに異なるものである。上記の、単一オクルージョン型の分散粒子形状を有するゴム変性スチレン系樹脂は、サラミ構造を有するものと比べて、光沢などの外観が向上するという利点がある。

【0027】単一オクルージョン型の分散粒子形状を有するゴム変性スチレン系樹脂はたとえば、スチレン含量が15~85%程度である、スチレンとゴム分とのブロック共重合体（スチレン-ブタジエンブロック共重合体など）の存在下で、スチレンを重合させるなどして製造される。単一オクルージョン型の分散粒子形状における、ゴム状重合体の粒子の、スチレン系樹脂の連続相中の分散粒径（平均粒径）は、およそ0.1~0.5μm程度であるのが好ましい。

【0028】ゴム状重合体の粒子の分散粒径が上記の範囲未満では、樹脂組成物の強度が低下するおそれがある。また逆に、分散粒径が上記の範囲を超えた場合には、ゴム変性スチレン系樹脂の均一性が低下するため、やはり樹脂組成物の強度が低下するおそれがある。また、光沢などの外観が悪化するおそれもある。なおゴム状重合体の粒子の分散粒径は、上記の範囲内でもとくに0.1~0.3μm程度であるのが好ましい。

【0029】かかる、ゴム状重合体の粒子の分散粒子形状や分散粒径は、下記のようにして測定、観察される。すなわち、ウルトラミクロトームなどを用いてゴム変性スチレン系樹脂の超薄切片を製作し、四塩化オスmium溶液におよそ一日、浸漬して染色したのち、その透過型電子顕微鏡写真を撮影して、写真中のゴム状重合体の粒子の分散粒子形状を確認するとともに、上記ゴム状重合体の分散粒径を計測する。

【0030】上記ゴム変性スチレン系樹脂中に含有させる、不飽和カルボン酸、不飽和カルボン酸エステルおよび酢酸ビニルからなる群より選ばれた少なくとも1種とエチレンとの共重合体としては、たとえばエチレン-アクリル酸共重合体、エチレン-メタクリル酸共重合体、エチレン-メタクリル酸メチル共重合体、エチレン-メタクリル酸エチル共重合体、エチレン-アクリル酸メチル共重合体、お

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よびエチレン-酢酸ビニル共重合体などがあげられる。これらの共重合体もそれぞれ単独で使用する他、2種以上を併用することもできる。

【0031】かかる共重合体は、ゴム変性スチレン系樹脂100重量部に対して0.1~10重量部程度の範囲で含有させるのが好ましい。共重合体の含有量が上記の範囲未満では、樹脂組成物の強度が低下するおそれがある。また逆に共重合体の含有量が上記の範囲を超えた場合には、樹脂組成物の耐熱性が低下するおそれがある。

【0032】なお共重合体の含有量は、上記の範囲内でもとくに、ゴム変性スチレン系樹脂100重量部に対して1~5重量部程度であるのが好ましい。上記の、(a)のゴム変性スチレン系樹脂としては、たとえば特開平8-151500号公報に開示された各種の樹脂があげられる。その具体例としては、これに限定されないがたとえば住友化学工業(株)製の商品名スミブライトDJシリーズがあげられ、その中でもとくに品番DJ8000、DJ9000などが、とくに耐油性にすぐれるために好適に使用される。

【0033】前記(b)のプロピレン系樹脂としては、プロピレンの単独重合体の他、プロピレンとエチレンとのランダムあるいはブロック共重合体なども使用できる。これらのプロピレン系樹脂もそれぞれ単独で使用する他、2種以上を併用することもできる。なおプロピレンの単独重合体、すなわちポリプロピレンや、あるいはプロピレンとエチレンとのブロック共重合体中のプロピレン部分としては、種々の立体規則性を有するものがいずれも使用可能であるが、本発明においては、(a)のゴム変性スチレン系樹脂自体が、前記のようにプロピレン系樹脂との相溶性にすぐれるため、通常の、プロピレン系樹脂との相溶性が低いスチレン系樹脂との相溶性を確保すべく使用される、特殊でかつ高価なシンジオタクチック構造を有する特殊なポリプロピレンなどを使用する必要がなく、主としてアイソタクチック構造やアタクチック構造を有する(もちろんシンジオタクチック成分が少量含まれていてもよい)、通常の汎用のポリプロピレンを使用することができる。

【0034】前記(c)の共重合体は、前述したようにとくに熱接着温度が180℃未満の低温域での、樹脂組成物の熱接着性を改善して、熱接着の安定性を高めるための成分であって、(a)のゴム変性スチレン系樹脂において説明したのと同様の、不飽和カルボン酸、不飽和カルボン酸エステルおよび酢酸ビニルからなる群より選ばれた少なくとも1種とエチレンとの共重合体が、いずれも使用可能である。

【0035】すなわちエチレン-アクリル酸共重合体、エチレン-メタクリル酸共重合体、エチレン-メタクリル酸メチル共重合体、エチレン-メタクリル酸エチル共重合体、エチレン-アクリル酸エチル共重合体、エチレン-アクリル酸メチル共重合体、およびエチレン-酢酸

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ビニル共重合体などを、それぞれ単独で使用する他、これらのうち2種以上を併用することもできる。

【0036】本発明に好適な(c)の共重合体としては、上記のうちエチレン-酢酸ビニル共重合体(EVA)があげられる。かかるEVAにおいては、酢酸ビニル成分の含有割合が、低温での熱接着性に密接に拘わっており、これに限定はされないが、酢酸ビニルの含有割合が5~25重量%程度のものが、本発明に好適なEVAとしてあげられる。

【0037】本発明においては、上記(a)のゴム変性スチレン系樹脂と、(b)のプロピレン系樹脂と、(c)の共重合体とを、前述したように重量比で(a)/(b)/(c)=10/87/3~50/90/20の割合で含有させる必要がある。すなわち図2に示す三角図のうち斜線とそれを囲む実線の領域が、本発明の樹脂組成物における、(a)~(c)の3成分の含有割合の範囲に相当する。

【0038】上記の範囲よりも(a)のゴム変性スチレン系樹脂が少ない場合、あるいは(b)のプロピレン系樹脂が多い場合には、とくに熱接着温度が180℃以上の高温域でのシール強度が高くなりすぎて、イージーピール性が低下するとともに、とくに樹脂組成物を容器本体に使用した場合に、当該容器本体の強度が低下し、かつ膜が弱くなって容器本体の形態安定性が低下してしまう。

【0039】また逆に、上記の範囲よりも(a)のゴム変性スチレン系樹脂が多い場合、あるいは(b)のプロピレン系樹脂が少ない場合には、前述した、熱接着が通常行われる温度範囲(180~230℃)のほぼ全域に亘ってシール強度が不足するとともに、容器の耐油性および耐熱性が低下し、かつ脆性が高くなってしまふ。また、上記範囲よりも(c)の共重合体が少ない場合には、当該共重合体を含有させたことによる、とくに熱接着温度が180℃未満の低温域での熱接着性を改善する効果が不十分となって、かかる低温域でのシール強度が不足する。

【0040】また逆に、上記の範囲よりも(c)の共重合体が多い場合には、とくにかかる樹脂組成物を容器本体に使用した場合に、当該容器本体の強度が低下し、かつ膜が弱くなって容器本体の形態安定性が低下してしまう。なお上記3成分の含有割合(a)/(b)/(c)は、上述した各特性、とくに低温域でのシール強度と、高温域でのイージーピール性とのバランスなどを考慮すると、前記の範囲内でもとくに15/80/5~30/50/20程度であるのが好ましく、15/80/5~20/80/20程度であるのがさらに好ましい。

【0041】またとくに、かかる樹脂組成物を容器本体に使用する場合には、上記の、低温域でのシール強度と、高温域でのイージーピール性とのバランスに加えて、さらに前述した容器本体の強度や膜の強さなども考慮して、3成分の含有割合(a)/(b)/(c)は、上記の範囲内でもとくに15/80/5~30/55/15程

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度であるのが好ましく、15/80/5~20/85/15程度であるのがより一層、好ましい。

【0042】本発明の樹脂組成物には、たとえば充てん剤、着色剤、難燃剤、滑剤（炭化水素系、脂肪酸系、脂肪酸アミド系、エステル系、アルコール系などの各種ワックス類、金属石けん類、シリコーン油、低分子量ポリエチレンなど）、展着剤（流動パラフィン、ポリエチレングリコール、ポリブテンなど）、分散剤、熱安定剤などの添加剤を添加してもよい。これらの添加剤は、製造された樹脂組成物の特性に影響を及ぼさない程度の範囲で添加される。

【0043】また、本発明の樹脂組成物は基本的に非発泡で使用するが、必要に応じて発泡させてもよい。樹脂を発泡させるには通常の発泡剤を使用して、たとえば容器本体の元になる原反シートなどを押出成形する際に、同時に発泡させればよい。つぎに、本発明の容器について説明する。本発明の容器の例としては、たとえば図1に示すように、単一の樹脂にて形成された単層構造の容器本体1と、フィルム状の蓋体2とを組み合わせたものがあげられる。

【0044】そして本発明においては、(1) 上記のうち容器本体1を、前述した本発明の樹脂組成物にて形成するとともに、蓋体2のうち、容器本体1に対する熱接着面となる基材層21を、プロピレン系樹脂にて形成するか、または逆に、(2) 容器本体1をプロピレン系樹脂にて形成するとともに、蓋体2のうち、容器本体1に対する熱接着面となる基材層21を、本発明の樹脂組成物にて形成することによって、容器本体1と蓋体2との間に、適度な熱接着性とイージーピール性とが付与される。

【0045】上記のうち容器本体1は、本発明の樹脂組成物、またはプロピレン系樹脂を押出成形するなどして形成した平板状かつ単層構造の原反シートを、従来同様に真空成形、圧空成形などによって容器本体の形状に成形するとともに、成形された容器本体の周囲に残るシートの端材を除去して製造される。また蓋体2は、やはり従来同様にプロピレン系樹脂、または本発明の樹脂組成物を押出成形するなどして形成したフィルム状の基材層21に、必要に応じて、図に示す表面層22などを積層して製造される。

【0046】表面層22は、先に述べたように、内容物の名称や説明などの印刷をするとともに、基材層21を補強するために積層されるもので、従来同様に、ポリエチレンテレフタレート樹脂（PET）やナイロンなどで形成される。印刷は、表面層22の、基材層21と積層される側の面に形成するのが好ましい。当該表面層22は、基材層21の押出成形時、ないしは成形後の任意の段階で積層することができる。

【0047】なお本発明の樹脂組成物は、前述した分散粒子形状ゆえに半透明ないし不透明状を呈するため、蓋

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体2をその意匠上の理由などで透明にしたい場合には、容器本体1を本発明の樹脂組成物にて形成するとともに、蓋体2の基材層21を、より透明性の高いプロピレン系樹脂にて形成するのが好ましい。ただし蓋体2が透明である必要のない場合は、いずれの組み合わせを採用してもよい。

【0048】上記の容器本体1と蓋体2とを備えた容器は、従来のものと同様にして、豆腐などの各種食品の包装などに使用することができる。たとえば前述した充てん豆腐製の、豆腐の包装の場合は、凝固する前の豆乳などを容器本体1内に充てんした後、当該容器本体1の熱接着部であるフランジ1aに、通常の熱接着装置を使用して、通常の熱接着の条件で、蓋体2を熱接着してやればよい。

【0049】かかる本発明の容器は、容器本体1と、蓋体2の熱接着面となる基材層21とが、それぞれ上記のように本発明の樹脂組成物と、プロピレン系樹脂とを組み合わせることで形成されるために、熱接着層を有しないにも拘わらず適度な熱接着性とイージーピール性とを兼ね備えたものとなる。また容器本体1は、図の例の場合、本発明の樹脂組成物、またはプロピレン系樹脂のみによって単層構造に形成されているため、たとえば端材の再利用や使用後のリサイクルが可能となる。ただし容器本体1には、必要に応じて他のフィルムを積層してもよい。

【0050】本発明の容器における、蓋体2のシール強度はとくに限定されないが、実用的な熱接着温度の範囲で、上述したように適度な熱接着性とイージーピール性とを兼ね備えたものとするためには、たとえば170~230℃の熱接着温度範囲でおおよそ0.4~1.5 kg f/15 mm程度であるのが好ましく、それより広い180~230℃の熱接着温度範囲でおおよそ0.4~1.5 kg f/15 mm程度であるのがさらに好ましく、上記180~230℃の熱接着温度範囲でおおよそ0.5~1.5 kg f/15 mm程度であるのがより一層、好ましい。

【0051】なお本発明の構成は、以上で説明した例のものには限定されない。たとえば、本発明の樹脂組成物の用途は容器には限定されず、プロピレン系樹脂との熱接着性およびイージーピール性を利用して、種々の分野への応用が可能である。また容器に使用する場合、容器本体1と蓋体2の形状、層構成、樹脂の組み合わせなどは図の例のものには限定されず、容器の用途などにあわせて適宜の設計変更が可能である。

【0052】その他、本発明の要旨を変更しない範囲で、種々の変更を施すことができる。

【0053】

【実施例】以下に本発明を、実施例、比較例に基づいて説明する。

実施例1

下記で製造した容器本体と蓋体とを組み合わせる容器を

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得た。

〈容器本体の製造〉前記(a)のゴム変性スチレン系樹脂としての、下記A1の樹脂15重量部と、(b)のプロピレン系樹脂としての、下記B1の樹脂75重量部と、(c)の共重合体としての、下記C1の樹脂10重量部と、これら樹脂の合計100重量部に対して1.5重量部の着色剤〔住化カラー(株)製の商品名YPPC1279〕とをドライブレンドしたのち、混合物を、単軸押出成形機のホッパに供給し、スクリーン径φ100mmのスクリーンシリンダ内で溶解、混練させた。

【0064】A1:ポリスチレンからなる連続相中に、スチレン-ブタジエンブロック共重合体の粒子が、単一オクルージョン型の分散粒子形状を有するように分散されているとともに、エチレン-アクリル酸エステル共重合体が含有されたゴム変性スチレン系樹脂〔前出の住友化学工業(株)製の商品名スミブライトDJ9000〕  
B1:エチレン-プロピレンブロック共重合体〔日本ポリケム(株)製の商品名EG-7F〕  
C1:エチレン-酢酸ビニル共重合体〔日本ポリケム(株)製の商品名LV540〕

つぎに上記の溶解、混練物を、スクリーンシリンダの先端に取り付けたTダイから、大気中にシート状に押出成形して、厚み0.8mm、1m<sup>2</sup>あたりの重量580gの、非発泡の原反シートを製造した。

【0065】そしてこの原反シートを、単発真空成形機を使用して、加熱温度(ヒーター設定温度):上=200℃、下=200℃、加熱時間2.5秒間の条件下で真空成形して、容器の開口の内法が縦115mm×横115mmの矩形状で、かつ深さが31mm、フランジの幅が10mmの、角形の容器本体を製造した。

〈蓋体の製造〉プロピレン系樹脂としての、上記B1の樹脂をフィルム状に押出成形しつつ、表面層としての厚み12μmのPETフィルムの片面に連続的に積層する\*

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\*ことで、厚み40μmの基材層を形成して、当該基材層と表面層の2層構造を有する、蓋体となる積層フィルムを製造した。

【0066】実施例2~7、比較例1、2

容器本体を形成する(a)~(c)の3種の樹脂としての、前記A1~C1の樹脂の使用量(重量部)を、下記表1、2に示す値としたこと以外は実施例1と同様にして容器本体を製造し、それを実施例1で製造したのと同じ蓋体と組み合わせて容器を得た。

10 【0067】比較例3~8

容器本体を形成する樹脂として、(c)の共重合体を使用せずに、(a)のゴム変性スチレン系樹脂としてのA1の樹脂と、(b)のプロピレン系樹脂としてのB1の樹脂の2種のみを使用するとともに、この2種の樹脂の使用量(重量部)を、下記表3、4に示す値としたこと以外は実施例1と同様にして容器本体を製造し、それを実施例1で製造したのと同じ蓋体と組み合わせて容器を得た。

【0068】熱接着性試験

上記各実施例、比較例で得た、真空成形前の原反シートと、蓋体となる積層フィルムとを、熱接着装置を用いて、熱接着圧力(設定値)1.0kg/cm、熱接着時間0.5秒間の条件下、下記表1~4に示す熱接着温度(ヒーター設定温度)で熱接着した。

【0069】そして上記の熱接着物を幅15mm、長さ50mmに亘って切り出したのち、180°引き剥がし時における15mm幅でのシール強度[kgf/15mm]を測定した。結果を表1~3および図3、4に示す。また各実施例、比較例における容器本体の組成を、前述した図2の三角図上にプロットした。なお、これら

30 の図においては実施例を「ex.」、比較例を「c e.」と略記した。

【0060】

【表1】

		比較例	実施例	実施例	実施例	実施例
		1	1	2	3	4
樹脂	A1	0	15	20	30	40
	B1	90	75	70	60	50
	C1	10	10	10	10	10
シール強度(kgf/15mm)						
熱接着温度(℃)	160	0.95	0.57	0.48	0.43	0.00
	170	0.75	0.85	0.87	0.67	0.45
	180	1.68	1.18	1.08	0.80	0.65
	190	1.73	1.21	1.11	0.80	0.72
	200	1.88	1.27	1.09	0.83	0.74
	210	1.70	1.25	1.11	0.80	0.71
	220	1.76	1.23	1.12	0.91	0.77
	230	1.80	1.28	1.15	0.92	0.74

【0061】

【表2】



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樹脂		実施例 5	比較例 2	実施例 6	実施例 7
	A1	50	60	20	20
	B1	40	30	75	60
	C1	10	10	5	20
シール強度 (kgf/15mm)					
熱接着 温度 (°C)	160	0.00	0.00	0.40	0.88
	170	0.22	0.00	0.79	0.86
	180	0.44	0.00	0.99	1.17
	190	0.48	0.25	1.05	1.25
	200	0.68	0.41	1.02	1.29
	210	0.75	0.38	1.05	1.29
	220	0.69	0.58	1.07	1.24
	230	0.71	0.61	1.11	1.28

\* [0082]  
[表3]

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樹脂		比較例 3	比較例 4	比較例 5	比較例 6
	A1	0	40	50	60
	B1	100	60	50	40
シール強度 (kgf/15mm)					
熱接着 温度 (°C)	160	0.00	0.00	0.00	0.00
	170	1.38	0.25	0.00	0.00
	180	1.80	0.38	0.24	0.00
	190	1.88	0.62	0.38	0.00
	200	1.95	0.51	0.42	0.21
	210	2.05	0.48	0.52	0.19
	220	2.10	0.63	0.49	0.35
	230	2.10	0.55	0.51	0.42

【0083】上記表、ならびに図の結果より、各実施例の容器はいずれも、各比較例のものに比べてより広い熱接着温度の範囲で、十分なシール強度とイージーピール性とを兼ね備えたものとなることが判明した。

#### 実施例8

容器本体の原料として、プロピレン系樹脂である前記B1の樹脂を使用するとともに、蓋体となる積層フィルム30のうち基材層の原料として、前記実施例1で容器本体を形成したのと同じ樹脂組成物を使用したこと以外は実施例1と同様にして容器を得た。

【0084】そして、容器本体を真空成形する前の原反シートと、蓋体となる積層フィルムとについて、上記と同様にして、その熱接着性を評価したところ、実施例1とはほぼ同様の測定結果が得られた。

#### 【0085】

【発明の効果】以上、詳述したように本発明によれば、種々の問題を生じる熱接着層を必要としないにも拘わらず、良好な熱接着性とイージーピール性とを兼ね備えた、容器の容器本体や蓋体を形成しうる、新規な樹脂組成物を提供できるという特有の作用効果を奏する。また本発明によれば、かかる樹脂組成物を用いることによって熱接着層を省略して、容器本体は、端材の再利用や使

用後のリサイクルが可能な単層構造としつつ、しかも容器本体と蓋体とが良好な熱接着性とイージーピール性とを兼ね備えた、新規な容器を提供することも可能となる。

#### 【図面の簡単な説明】

【図1】本発明の容器を構成する容器本体と蓋体の、層構成の一例を示す概略断面図である。

【図2】本発明の樹脂組成物における、3成分の樹脂の、含有割合の範囲を示す三角図である。

【図3】本発明の実施例、比較例における、熱接着温度とシール強度との関係を示すグラフである。

【図4】本発明の比較例における、熱接着温度とシール強度との関係を示すグラフである。

【図5】同図(a)~(c)はそれぞれ、従来の容器を構成する容器本体と蓋体の、層構成の一例を示す概略断面図である。

【図6】従来の容器を構成する容器本体と蓋体の、層構成の他の例を示す概略断面図である。

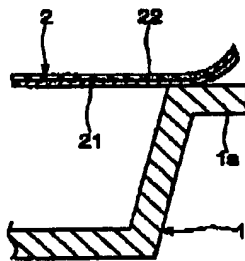
#### 【符号の説明】

- 1 容器本体
- 2 蓋体

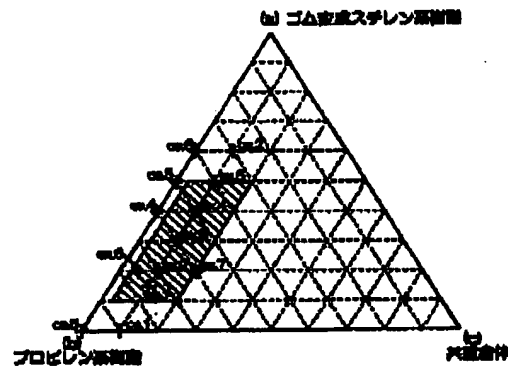
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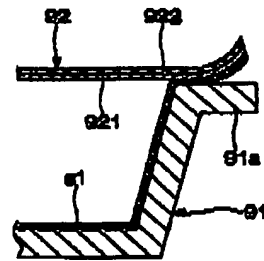
【図1】



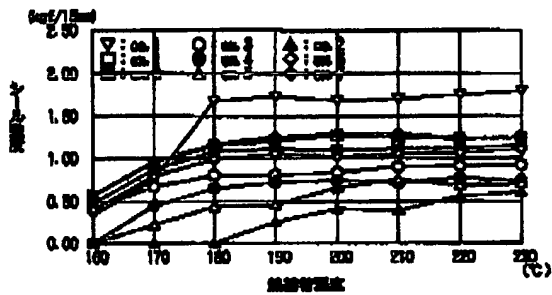
【図2】



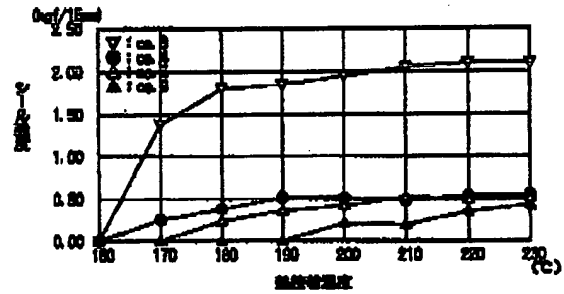
【図3】



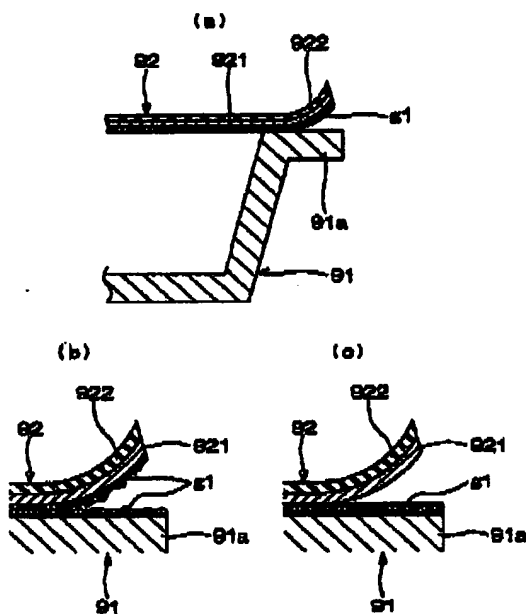
【図3】



【図4】



【図5】



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